UNITED STATES PATENT APPLICATION

OF

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FOR

WASHING MACHINE CONTROL METHOD

[0001] This application claims the benefit of Korean Application No. 10-2002-0074069 filed on November 26, 2002, which is hereby incorporated by reference.

BACKGROUND OF THE INVENTION

Field of the Invention

[0002] The present invention relates to a washing machine control method, and more particularly, to a washing machine control method, in which dewatering speed is controlled based on water temperature to prevent a degradation of elements of the washing machine.

Discussion of the Related Art

[0003] Generally, a washing machine is operated by driving a wash motor to rotate inner and outer tubs filled with water and laundry. At the time of dewatering, the rotating speed is very high so that the water is separated from the laundry using a centrifugal force created by the high-speed rotation.

[0004] Referring to FIG. 1, a general washing machine is comprised of an outer tub 102 for holding water and an inner tub 103 for holding laundry. The inner tub 103 has a multitude of washing holes 104 and is rotatably installed in the outer tub 102. A wash motor 107 is coupled to the inner tub 103 via a drive shaft 106 rotating the inner tub.

[0005] Referring to FIG. 2, a control apparatus for a general washing machine includes a key input unit 201 for inputting user commands including a wash course selection, a temperature sensor 203 for sensing a temperature of washing water, a microcomputer 205 for outputting a control signal for performing washing, rinsing, and dewatering steps according to the selected washing course, and a wash motor 207 having a variable driving speed according to the control signal output from the microcomputer.

[0006] FIG. 3 illustrates a washing machine control method according to a related art,

including the washing, rinsing, and dewatering steps of a general washing machine as described above.

[0007] Referring to FIG. 3, upon selection of a wash course via the key input unit 201, washing water is supplied in a step S301 to the tub to perform a washing step S302. After completion of the washing step, the washing water is drained from the tub in a step S303, so that rinsing water may be supplied in a step S304 to perform a rinsing step S305, which is followed by another draining step S306. Since multiple rinse cycles may be performed, a step S307 determines whether rinsing has been completed. Immediately after completion of the final rinse cycle, dewatering is performed in a step S308 to separate the rinsing water from the laundry.

[0008] Dewatering is carried out by controlling the wash motor 107 to rotate the inner tub 103 at speeds as high as 1,000 rpm via the drive shaft 106. In doing so, a centrifugal force is generated to bring the laundry into tight contact with the outer wall of the inner tub 103, with the water passing through the washing holes 104 to be discharged from the washing machine.

[0009] When very hot water is used for rinsing, however, the inner and outer tubs 103 and 102 absorb and retain the heat of the water. Thus, during high speed rotation, the inner and outer tubs 103 and 102 tend to lose their physical properties, i.e., deform, so as to be brought into contact with each other, which is especially problematic when the washing machine employs plastic-based elements. As a result, the operational endurance of such a washing machine is degraded.

SUMMARY OF THE INVENTION

[0010] Accordingly, the present invention is directed to a washing machine control

method that substantially obviates one or more of the problems due to limitations and disadvantages of the related art.

[0011] An object of the present invention, which has been devised to solve the foregoing problem, lies in providing a washing machine control method, in which water temperature is sensed prior to a final draining step to control a dewatering speed, to preclude high-speed rotation of a heated tub and thereby improve the endurance of the washing machine.

[0012] Additional features and advantages of the invention will be set forth in the description which follows, and in part will be apparent to those having ordinary skill in the art upon examination of the following or may be learned from a practice of the invention. The objectives and other advantages of the invention will be realized and attained by the subject matter particularly pointed out in the specification and claims hereof as well as in the appended drawings.

[0013] To achieve these objects and other advantages in accordance with the present invention, as embodied and broadly described herein, there is provided a washing machine control method comprising steps of supplying water to a tub for performing a final operational step; draining the water from the tub; sensing the temperature of the drained water; and controlling a dewatering speed according to the sensed water temperature.

[0014] It is to be understood that both the foregoing explanation and the following detailed description of the present invention are exemplary and illustrative and are intended to provide further explanation of the invention as claimed.

BRIEF DESCRIPTION OF THE DRAWINGS

[0015] The accompanying drawings, which are included to provide a further

understanding of the invention and are incorporated in and constitute a part of this application, illustrate embodiment(s) of the invention and together with the description serve to explain the principle of the invention. In the drawings:

[0016] FIG. 1 is a cross-sectional view of a general washing machine;

[0017] FIG. 2 is a block diagram of a control apparatus of a general washing machine;

[0018] FIG. 3 is a flowchart of washing, rinsing, and dewatering steps of a washing machine control method according to a related art; and

[0019] FIG. 4 is a flowchart of a washing machine control method according to the present invention.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENT

[0020] Reference will now be made in detail to the preferred embodiment of the present invention, examples of which are illustrated in the accompanying drawings. Throughout the drawings, like elements are indicated using the same or similar reference designations where possible.

[0021] Referring to FIG. 4, illustrating a washing machine control method according to the present invention, upon selection of a wash course via the key input unit 201, washing water is supplied in a step S401 to the tub to perform a washing step S402. After completion of the washing step, the washing water is drained from the tub in a step S403, so that rinsing water may be supplied in a step S404 to perform a rinsing step S405, which is followed by another draining step S407. Since multiple rinse cycles may be performed, a step S406 determines whether the final rinse cycle has been reached.

[0022] Prior to draining the tub on the final cycle, i.e., with water still in the tub and

transferring heat to the inner tub 103, the water temperature is sensed in a step S408. In practice, however, the water temperature can still be sensed as the final draining step proceeds, as long as an amount of water remains in the outer tub 102. Thus, the temperature of the water used in the final rinsing step is sensed. Here, it should be noted that the rinsing steps may be omitted, so that the final operational step before dewatering is the washing step and the sensed water temperature is that used for washing.

[0023] It is then determined in a step S409 whether the sensed temperature exceeds a predetermined setup temperature. If the sensed temperature is lower than the predetermined temperature, draining is completed in a step S410 and a normal-speed dewatering proceeds in a step S411. In this case, the dewatering speed is set according to the selected wash course and may be as high as 1,000 rpm. If, on the other hand, the sensed temperature is higher than the predetermined temperature, draining is completed in a step S412 and a reduced-speed dewatering proceeds in a step S413 to prevent deformation of the inner tub 103. In this case, the dewatering speed is limited (i.e., rpm = rpm_hot) since a high-speed rotation of a heated inner tub may cause tub deformation.

[0024] The reduced dewatering speed is preferably limited to approximately 700 rpm. Accordingly, the rotational speed of the inner tub is limited to 700 rpm if the temperature of the rinsing water exceeds the predetermined temperature, to preserve the physical properties of elements of the washing machine, especially, the inner and outer tubs 103 and 102. In a similar manner, a plurality of limiting dewatering speeds may be set according to corresponding referential water temperatures.

[0025] Therefore, the washing machine control method according to the present invention employs a temperature sensor and a variable-speed motor. The water temperature of the final draining is sensed and compared to a predetermined temperature. Dewatering is

performed at a reduce speed if the sensed temperature exceeds the predetermined temperature but is otherwise performed at the normal speed, thereby preventing the degradation of a washing machine using hot water for rinsing.

[0026] It will be apparent to those skilled in the art that various modifications and variations can be made in the present invention without departing from the spirit or scope of the invention. Thus, it is intended that the present invention cover such modifications and variations, provided they come within the scope of the appended claims and their equivalents.